

ISSUE DOCUMENTATION – RTCA SC-186



Tracking Information (committee secretary only)	
Change Issue Number	12
Submission Date	13 January 2004
Status (open/closed/deferred)	Pending
Last Action Date	

Short Title for Change Issue:	Feedback on Air/Ground determination for non-automatic means
-------------------------------	--

Topic:	ASA	High-level	ASAS	STP	ASSAP	CDTI
Document Reference:	DO-289			Originator Information:		
Entire document (y/n)	No			Name	Tom Mosher, Garmin AT	
Section number(s)	3.1.2.4			Phone	(503) 391-3522	
Paragraph number(s)				E-mail	tom.mosher@garmin.com	
Table/Figure number(s)				Other		

Proposed Rationale for Consideration (originator should check all that apply):	
<input type="checkbox"/>	Item needed to coordinate with other documents
<input type="checkbox"/>	ASA MASPS
<input checked="" type="checkbox"/>	1090 MHz Link MOPS
<input checked="" type="checkbox"/>	UAT Link MOPS
<input type="checkbox"/>	TIS-B MASPS
<input type="checkbox"/>	Previously written CDTI MOPS
<input checked="" type="checkbox"/>	Other (include document title): ADS-B MASPS
<input type="checkbox"/>	Item needed for harmonization with international requirements
<input checked="" type="checkbox"/>	Item identified during recent ADS-B development activities and operational evaluations
<input type="checkbox"/>	MOPS clarifications and correction item
<input type="checkbox"/>	Validation/modification of questioned MOPS requirement item
<input type="checkbox"/>	Military use provision item
<input type="checkbox"/>	New requirement item

Nature of Issue:	Editorial	Clarity	Performance	Functional
Issue Description (attach additional sheets if necessary):				
<p>As implemented in the UAT MOPS Rev A (DO-282A), the test procedures for verification of vertical status show that there are some unintended outcomes of the ASA MASPS requirements for air/ground determination when no automatic means is available. To wit:</p> <p>1 - If Radio Altitude (RA) is not available, and either Ground Speed (GS) or Air Speed (AS) is available (but not both), then the aircraft will report as Airborne regardless of what the Ground Speed or Air Speed is. To illustrate, the following examples are taken from the UAT MOPS test procedures:</p> <p style="padding-left: 40px;">GS = 25 knot, AS not available, RA not available, result = AIRBORNE. AS = 25 knot, GS not available, RA not available, result = AIRBORNE.</p> <p>Note that the GS or AS could be as low as 1 knot, or indeed 0 knots, as long as the data is available, with the same result.</p> <p>The problem stems from the logic in the ASA MASPS requirement (paraphrased): "Otherwise, if RA is not available, and if the participant's GS and AS are available, and GS < 50 knots and AS < 50 knots, then that participant shall set its Vertical Status to ON-GROUND."</p> <p>If this condition is not met, the default setting for Vertical Status is AIRBORNE. The lack of any lower limits on the AS or GS value means that regardless of what the AS or GS value is, as long as</p>				

only one of them is available, the aircraft must report that it is AIRBORNE.

- 2 - Another similar problem can be caused when the RA is available, but the GS and AS are both not available. In this case, the requirement applies the following logic (paraphrased):

"If the participant's RA is available, and $RA < 50$ feet, and at least GS or AS is available and < 100 knots, the Vertical Status shall be set to ON-GROUND".

In this case if both GS and AS are not available, then regardless of the RA value, even 0 feet, the aircraft will report as AIRBORNE because that is the default condition when the above logic is not met. The lack of any minimum threshold for the Radio Altitude causes the AIRBORNE condition to be reported no matter what the RA value is.

Originator's proposed resolution if any (attach additional sheets if necessary):

1. Review the logic that is used to determine the Air/Ground state when no automatic means is available.
2. Consider inserting some minimum value of Radio Altitude which must be exceeded before the AIRBORNE state can be declared.